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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/568,445	02/15/2006	Yue Yang	127030	9749

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OLIFF & BERRIDGE, PLC
P.O. BOX 19928
ALEXANDRIA, VA 22320

EXAMINER	
LEUNG, PHILIP H	
ART UNIT	PAPER NUMBER
3742	

MAIL DATE	DELIVERY MODE
08/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/568,445	YANG ET AL.	
	Examiner	Art Unit	
	Philip H. Leung	3742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 16-30 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 16-30 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 15 February 2006 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 2-15-2006 & 6-5-2007.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The drawings filed 2-15-2006 are acceptable.

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 16, 17, 25, 27, 29 and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Reboux et al (US 4,300,031).

Reboux shows an induction heating apparatus comprising: an electric power supply apparatus (Figure 2) for supplying electric power with different frequencies to an induction load to make the induction load 1, 2 work, and an induction heating coil 10 which induction-heats a workpiece-to-be-heated 1, 2 with the electric power having different frequencies supplied from the electric power supply apparatus, wherein the induction heating apparatus comprises: a generator that outputs AC electric power with different frequencies; a matching circuit 60, 70 that constitutes, together with the induction load 1, 2, a plurality of resonance circuits corresponding to the different frequencies; and a control circuit that controls the supply of the AC electric power output from the generator to one of the resonance circuits of the matching circuit so that the frequency of the AC electric power matches a predetermined resonance frequency (see Figure 2 and col. 3, lines 17-68 and col. 7, line 11 – col. 10, line 31). In regard to claim 17, it shows a matching transformer as claimed.

4. Claims 16-18, 25, 27, 29 and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Horiuchi (US 4,886,952) (cited by the applicant).

Horiuchi shows an induction heating apparatus comprising: an electric power supply apparatus for supplying electric power with different frequencies to an induction load to make the induction load work, and an induction heating coil 1 which induction-heats a workpiece-to-be-heated with the electric power having different frequencies supplied from the electric power supply apparatus, wherein the induction heating apparatus comprises: a generator 2 that outputs AC electric power with different frequencies; a matching transformer circuit 3 and capacitor network (A, B, C) that constitutes, together with the induction load 1, 2, a plurality of resonance circuits (f1, f2, f3) corresponding to the different frequencies; and a control circuit that controls the supply of the AC electric power output from the generator to one of the resonance circuits of the matching circuit so that the frequency of the AC electric power matches a predetermined resonance frequency (see Figures 1-3 and col. 2, line 54 – col. 5, line 45). In regard to claims 17 and 18, it shows a matching transformer having a plurality of taps 6 as claimed.

5. Claims 16, 29 and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Nanba (JP 2002-367763) (cited by the applicant).

Nanba shows an induction heating apparatus comprising: an electric power supply apparatus (Figure 1) for supplying electric power with different frequencies to an induction load to make the induction load 24 work, and an induction heating coil 22 which induction-heats a workpiece-to-be-heated 24 with the electric power having different frequencies supplied from the electric power supply apparatus, wherein the induction heating apparatus comprises: a

generator that outputs AC electric power with different frequencies; a matching circuit 40 that constitutes, together with the induction load 24, a plurality of resonance circuits corresponding to the different frequencies; and a control circuit 32 that controls the supply of the AC electric power output from the generator 10 to one of the resonance circuits of the matching circuit so that the frequency of the AC electric power matches a predetermined resonance frequency (see Figure 1 and the English translation).

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 17-19 are rejected under 35 U.S.C. 103(a) as being obvious over Nanba (JP 2002-367763), in view of Reboux et al (US 4,300,031) or Horiuchi (US 4,886,952).

As set forth above, Nanba shows an induction heating apparatus comprising: an electric power supply apparatus (Figure 1) for supplying electric power with different frequencies to an induction load to make the induction load 24 work, and an induction heating coil 22 which

induction-heats a workpiece-to-be-heated 24 with the electric power having different frequencies supplied from the electric power supply apparatus, wherein the induction heating apparatus comprises: a generator that outputs AC electric power with different frequencies; a matching circuit 40 that constitutes, together with the induction load 24, a plurality of resonance circuits corresponding to the different frequencies; and a control circuit 32 that controls the supply of the AC electric power output from the generator 10 to one of the resonance circuits of the matching circuit so that the frequency of the AC electric power matches a predetermined resonance frequency. Therefore it shows every feature as claimed except for the use of a matching transformer. Reboux shows an induction heating apparatus comprising: an electric power supply apparatus (Figure 2) for supplying electric power with different frequencies to an induction load to make the induction load 1, 2 work, and an induction heating coil 10 which induction-heats a workpiece-to-be-heated 1, 2 with the electric power having different frequencies supplied from the electric power supply apparatus, wherein the induction heating apparatus comprises: a generator that outputs AC electric power with different frequencies; a matching transformer circuit 70 that constitutes, together with the induction load 1, 2, a plurality of resonance circuits corresponding to the different frequencies; and a control circuit that controls the supply of the AC electric power output from the generator to one of the resonance circuits of the matching circuit so that the frequency of the AC electric power matches a predetermined resonance frequency (see Figure 2 and col. 3, lines 17-68 and col. 7, line 11 – col. 10, line 31). Horiuchi shows an induction heating apparatus comprising: an electric power supply apparatus for supplying electric power with different frequencies to an induction load to make the induction load work, and an induction heating coil 1 which induction-heats a workpiece-to-be-heated with

the electric power having different frequencies supplied from the electric power supply apparatus, wherein the induction heating apparatus comprises: a generator 2 that outputs AC electric power with different frequencies; a matching transformer circuit 3 and capacitor network (A, B, C) that constitutes, together with the induction load 1, 2, a plurality of resonance circuits (f1, f2, f3) corresponding to the different frequencies; and a control circuit that controls the supply of the AC electric power output from the generator to one of the resonance circuits of the matching circuit so that the frequency of the AC electric power matches a predetermined resonance frequency (see Figures 1-3 and col. 2, line 54 – col. 5, line 45). In regard to claims 17 and 18, it shows a matching transformer having a plurality of taps 6 as claimed. It would have been obvious to an ordinary skill in the art at the time of invention to modify Nanba to use a matching transformer to tune the resonant frequency to match the load for better heating efficiency and result, in view of the teaching of Reboux or Horiuchi.

8. Claims 20-24 are rejected under 35 U.S.C. 103(a) as being obvious over Nanba (JP 2002-367763), in view of Nakamura (JP 2001-112268) (cited by the applicant).

As set forth above, Nanba shows an induction heating apparatus comprising: an electric power supply apparatus (Figure 1) for supplying electric power with different frequencies to an induction load to make the induction load 24 work, and an induction heating coil 22 which induction-heats a workpiece-to-be-heated 24 with the electric power having different frequencies supplied from the electric power supply apparatus, wherein the induction heating apparatus comprises: a generator that outputs AC electric power with different frequencies; a matching circuit 40 that constitutes, together with the induction load 24, a plurality of resonance circuits

corresponding to the different frequencies; and a control circuit 32 that controls the supply of the AC electric power output from the generator 10 to one of the resonance circuits of the matching circuit so that the frequency of the AC electric power matches a predetermined resonance frequency. Therefore it shows every feature as claimed except for the use of a ratio controller. Nakamura shows an induction power supply circuit having a controller 37, 48 to control the inverter frequency according to current detector output to control the frequency and power (see Figures 1 and 2 and the abstract and paragraphs [0009] – [0023] of the English translation). It would have been obvious to an ordinary skill in the art at the time of invention to modify Nanba to use a controller to control the resonant frequency and power of the inverter circuit according to a sensed parameter for more precise heating control and better heating efficiency and result, in view of the teaching of Nakamura.

9. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being obvious over Nanba (JP 2002-367763), in view of Yamada (JP 2002-171766) (cited by the applicant).

As set forth above, Nanba shows an induction heating apparatus comprising: an electric power supply apparatus (Figure 1) for supplying electric power with different frequencies to an induction load to make the induction load 24 work, and an induction heating coil 22 which induction-heats a workpiece-to-be-heated 24 with the electric power having different frequencies supplied from the electric power supply apparatus, wherein the induction heating apparatus comprises: a generator that outputs AC electric power with different frequencies; a matching circuit 40 that constitutes, together with the induction load 24, a plurality of resonance circuits corresponding to the different frequencies; and a control circuit 32 that controls the supply of the

AC electric power output from the generator 10 to one of the resonance circuits of the matching circuit so that the frequency of the AC electric power matches a predetermined resonance frequency. Therefore it shows every feature as claimed except for controlling the frequency of the power based on a frequency current of the resonant circuit. Yamada shows an induction power supply circuit having a controller 24 to control the inverter frequency according to current detector 14 output to control the frequency with a zero-current switching operation (see Figures 1-3 and the English abstract). It would have been obvious to an ordinary skill in the art at the time of invention to modify Nanba to use a current detector to control the frequency of the power by performing a zero-current switching operation to reduce switching loss for better heating efficiency and result, in view of the teaching of Yamada.

10. Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being obvious over Nanba (JP 2002-367763), in view of Kudo (JP 11-262265) (cited by the applicant).

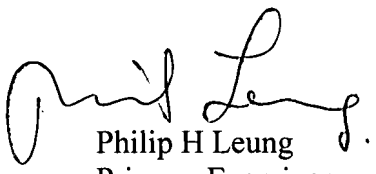
As set forth above, Nanba shows an induction heating apparatus comprising: an electric power supply apparatus (Figure 1) for supplying electric power with different frequencies to an induction load to make the induction load 24 work, and an induction heating coil 22 which induction-heats a workpiece-to-be-heated 24 with the electric power having different frequencies supplied from the electric power supply apparatus, wherein the induction heating apparatus comprises: a generator that outputs AC electric power with different frequencies; a matching circuit 40 that constitutes, together with the induction load 24, a plurality of resonance circuits corresponding to the different frequencies; and a control circuit 32 that controls the supply of the AC electric power output from the generator 10 to one of the resonance circuits of the matching

circuit so that the frequency of the AC electric power matches a predetermined resonance frequency. Therefore it shows every feature as claimed except for the use of an output control circuit. Kudo shows a power converter having a controller 10 to control the voltage out put with a feedback circuit (see all Figures and the English abstract). It would have been obvious to an ordinary skill in the art at the time of invention to modify Nanba to use an output controller to adjust the power output for better heating control and result, in view of the teaching of Kudo.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Philip H. Leung whose telephone number is (571) 272-4782.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tu Hoang can be reached on (571)-272-4780. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Philip H Leung
Primary Examiner
Art Unit 3742

P.Leung/pl
8-3-2007